EXHIBIT 10

DEPARTMENT OF HEALTH AND MENTAL HYGIENE
BOARD OF HEALTH

NOTICE OF ADOPTION OF AN AMENDMENT (§81.50)
TO ARTICLE 81 OF THE NEW YORK CITY HEALTH CODE

In compliance with §1043(b) of the New York City Charter (the "Charter"), and pursuant to the authority granted to the Board of Health by §558 of said Charter, a Notice of Intention to amend Article 81 of the New York City Health Code, adding a new §81.50, was published in the City Record on September 29, 2006, and a public hearing was held on October 30, 2006. More than 2,200 written and oral comments were received, including testimony from 45 persons who testified at the public hearing. At its meeting on December 5, 2006, the Board of Health adopted the following resolution.

STATUTORY AUTHORITY

This amendment to the Health Code is promulgated pursuant to §§558 and 1043 of the Charter. Section 558(b) and (c) of the Charter empowers the Board of Health to amend the Health Code and to include in the Health Code all matters to which the Department's authority extends. Section 1043 grants the Department rule-making authority.

STATEMENT OF BASIS AND PURPOSE

The Department of Health and Mental Hygiene (the "Department") enforces provisions of the New York City Health Code ("Health Code") and other applicable law relating to food served directly to the consumer throughout the City, including food that is commercially prepared, and sold or distributed for free, by food service establishments, a broad category which includes restaurants, caterers and mobile food vending units. The Department also regulates non-retail food processing establishments, such as mobile food vending commissaries, as defined in Health Code §89.01, which supply food for mobile vending units.

Background

Restaurants (the term is being used interchangeably with "food service establishments" or "FSEs") are an important source of daily food intake for New York City residents: an estimated one third of daily caloric intake comes from foods purchased outside of the home.[1] Assuring safe and healthy dining options is a public health priority. The Department issues permits and inspects all New York City FSEs and non-retail food processing establishments, as defined in §81.03(j) and (p) of the Health Code. Although federally mandated nutrition labeling on food products for sale in supermarkets facilitates informed choice, consumers lack such essential information to make healthy choices when eating in restaurants. Calorie information, if provided at the time of food selection, would allow New Yorkers to make more informed choices. Accordingly, Article 81 of the New York City Health Code is being amended to require that information on calorie content values of menu items be available to patrons of FSEs at the time of ordering when such information is otherwise made publicly available by or on behalf of the FSEs.

The Department is charged with preventing and controlling diseases, including chronic disease, through approaches that may address individual behavior or the community environment. By requiring posting of available information concerning restaurant menu item calorie content, so that such information is accessible at the time of ordering, this Health Code amendment will allow individuals to make more informed choices that can decrease their risk for the negative health effects of overweight and obesity associated with excessive calorie intake.

Obesity is epidemic

According to measured height and weight data from the National Health and Nutrition Examination Survey (NHANES), the obesity rate among U.S. adults more than doubled over the past three decades from 14.5% in 1971-1974 to 32.2% in 2003-2004.[2,3] In New York City, more than half of adults are overweight and one in six is obese.[4] Obesity begins early – 21% of New York City kindergarten children are obese.[5] People who are overweight are at increased risk for diabetes, heart disease, stroke, high blood pressure, arthritis, and cancer. Diagnosed diabetes more than doubled over the past decade and now affects three quarters of a million New Yorkers.[6]

If rates of obesity continue to rise unabated, it has been estimated that one in three children (and half of Hispanic children) born in 2000 will develop diabetes in his or her lifetime.[7]

'Away from Home' food consumption increasingly fuels obesity and chronic illness

Americans are increasingly eating meals away from home. In 1970, Americans spent 26% of their food dollars on foods prepared outside their homes while by 2006 they spent almost half (48%) of their food dollars eating out.[8] As previously noted, the average American consumes about one third of calories from foods from restaurants.[9] Children eat almost twice as many calories when they eat out than when they eat at home.[10]

Nutrition labeling works and is supported by consumers and leading experts

Since 1994, the federal Nutrition Labeling and Education Act (NLEA) has made nutrition information available to consumers on packaged foods purchased in retail stores. This information is widely used. Three-quarters of American adults report using food labels,[11] and about half (48%) report that nutrition information on food labels has caused them to change their food purchasing habits.[12] However, NLEA explicitly exempts restaurants from nutrition labeling requirements, and at most restaurants, people can only guess the nutrient content of foods at the point of purchase. Current voluntary attempts by some food service establishments to make available nutrition information are inadequate particularly because the information is usually not displayed where consumers are making their choices and purchases. When FSEs' nutrition information is available on the internet, patrons need to have access to off-site websites. Such information may also be available in brochures, on placemats covered with food items, or on food wrappers, where the information is hard to find or difficult to read and only accessible after the purchase is made. Thus the information provided has little impact on choice.[13]

Without calorie information, it is difficult for consumers to compare options and make informed decisions. People do not accurately guess the calorie content of foods and beverages, and calorie information will help guide food choices. Recent studies found that 9 out of 10 people underestimated the calorie content of less-healthy items by an average of more than 600 calories (almost 50% less than the actual calorie content).[14] When calorie information was provided on food items, consumers chose high-calorie items 24% to 37% less often.

Additional marketing research has shown that providing nutrition information affects consumer attitudes and purchasing intentions. Consumers consistently underestimate the nutrient levels in food items and overestimate the healthfulness of restaurant items.[15] When consumers are made aware of nutrition information at the point of purchase, disease risk perceptions increase, attitudes toward the product change, and purchasing intentions for unhealthy products decrease.[16,17] Presenting nutrition information on restaurant menus empowers consumers and influences food choices.[18]

Studies consistently show that consumers would like to have this information. Six nationally representative polls have found that between 62% to 87% of Americans support requiring restaurants to list nutrition information.[19,20]

A key recommendation of a recent Food and Drug Administration-sponsored expert group report on obesity and eating away from the home was that, "Away-from-home food establishments should provide consumers with calorie information in a standard format that is easily accessible and easy to use. Participants believe that information should be provided in a manner that is easy for consumers to see and use as part of their purchasing and eating decisions. Information should be provided for any standard menu item offered on a regular and ongoing basis that is prepared from a standardized recipe, whether the item is an entire meal or a meal component. Non-standard items, including daily specials and experimental items, may be exempted. Information should be provided for the standard menu item as usually offered for sale (i.e., the base product, in the portion size as offered for sale), since most means of providing information cannot easily account for changes due to customization and special orders."[21]

Changes to Health Code to require calorie labeling

New York City needs to address the rapidly growing twin epidemics of obesity and diabetes. Calorie labeling is a public heath intervention to help address these problems. Providing simple, point-of-purchase calorie information would allow consumers to make more informed food choices in restaurants just as they currently can in supermarkets.

As amended, Health Code §81.50 requires FSEs that make calorie information for standardized menu items publicly available (published by or on behalf of the FSE) on or after March 1, 2007, to post such calorie (kcal) information on menu boards and menus, next to each menu item (Figure 1). Of course, in order for the calorie information to be accurate, such a requirement can only be implemented for food items that are standardized with regard to portion size, formulation, and ingredients. Therefore, it is expected that the proposal would apply only to the approximately 10% of New York City food service establishments that serve food menu items in portions that are standardized for size and content and currently post calorie information on these items. Posting of calorie content information will be required for any menu items for which calorie content has been made publicly available. Calorie amounts shall be posted in a size and typeface at least as large as the price or name of the menu item. This provision does not require any FSE to engage in analysis of the nutrition content of its menu items, but does require restaurants that make such information publicly available to their customers to post it in plain sight, so it is available at the time of ordering. By doing so, these FSEs will enable New Yorkers to have the information they need to make more informed choices.

MENU	Calories	Price
HAMBURGER	280	.89
CHEESEBURGER	330	.99
FISH FILET	470	1.99
CRUNCHY CHICKEN	550	2.79
4 OZ HAMBURGER	430	2.29
EXTRA BIG HAMBURGER	540	2.29
BIG BIG BURGER	590	2.39
GRILLED CHICKEN	450	2.89
8 OZ BURGER	760	2.99

FIGURE 1: Example of Menu Board with Calorie Labeling[22]

Only FSEs that make nutritional information publicly available on or after March 1, 2007, such as in brochures, signage, websites, or other means, will be required to post calorie information. Posted calorie content information will be calculated in accordance with 21 CFR §101.9(c)(1)(i) or its successor regulation. FSEs would not be precluded from providing additional nutrition information voluntarily.

The Department's restaurant inspectors would be responsible for enforcing the requirement that nutrition information is provided on menu boards and menus.

Changes made in response to public comments

Substantial support was received for the proposal in written comments and oral testimony. Of the approximately 2,200 written and oral comments received, all but 22 supported the amendment. The proposal has been further amended in response to the comments and for clarity. To clearly identify the number of calories displayed, as in Figure 1, above, FSEs will be required to place the word "calories" or "cal" as a heading above the column listing the number of calories, or adjacent to the calorie content value for each menu item. In response to comments that requiring display of the median calorie content value for menu items offered in a range of flavors or varieties could be confusing, the proposal has been amended so that FSEs will now be required to display the range (minimum to maximum) of calories applicable to all flavors or varieties rather than calculating the median number of calories for the menu item. Finally, FSEs will also be allowed to exercise flexibility in how they display calorie information at the point of purchase, subject to the Department's prior approval.

STATEMENT PURSUANT TO SECTION 1042 – REGULATORY AGENDA

The proposed amendment was not included in the Department's Regulatory Agenda because it resulted from a recent analysis by the Department.

The proposal is as follows:

Note-matter in brackets [ ] to be deleted
Matter underlined is new

RESOLVED, that Article 81 of the New York City Health Code, set forth in title 24 of the Rules of the City of New York, as last amended by resolution adopted on the seventh of June, two thousand five, be, and the same hereby is further amended, to add a new section 81.50, to be printed with explanatory notes, as follows:

§81.50 Calorie labeling.

(a) *Scope and applicability.* This section shall apply to menu items that are served in portions the size and content of which are standardized and for which calorie content information is made publicly available on or after March 1, 2007, by or on behalf of the food service establishment serving the items.

(b) *Calorie information for menu items.* Food service establishments shall post on menu boards and menus the calorie content values (in kcal) that have been made publicly available as specified in subdivision (a) for each menu item next to the listing of each menu item. Posted calorie content shall be calculated in accordance with 21 CFR §101.9(c)(1)(i) or its successor regulation. Subject to prior approval by the Department, food service establishments may use alternative means for making calorie

information available to patrons, provided such information is made available at the point of purchase and is at least as prominent as required in paragraph (1) below.

(1) *Menu boards and menus.* The term "calories" or "cal" shall appear as a heading above a column listing the calorie content value of each menu item, or adjacent to the calorie content value for each menu item, in the same or larger typeface as the calorie content values for individual menu items.

(A) *Menu boards.* On menu boards, caloric content values shall be posted in a size and typeface at least as large as the name of the menu item or price, whichever is larger.

(B) *Menus.* On printed menus, calorie content values shall be legible and shall be printed in a size and typeface at least as large as the name or price of the menu item.

(2) *Range of calorie content values for different flavors and varieties.* For menu items that come in different flavors and varieties but that are listed as a single menu item, including, but not limited to, beverages, ice cream, pizza or doughnuts, the range of calorie content values showing the minimum to maximum numbers of calories for all flavors or varieties of that item shall be listed on menu boards and menus for each size offered for sale.

(c) *Effective date.* This section shall take effect on July 1, 2007.

Notes: Section 81.50 was added by resolution adopted on December 5, 2006 to require that food service establishments in New York City that sell food items whose portion size and content are standardized prominently display publicly available information about the calorie content of such items on menu boards and menus in an effort to facilitate patrons' nutritional choices at time of purchase.

RESOLVED, that the list of Section Headings in Article 81 of the New York City Health Code, set forth in title 24 of the Rules of the City of New York, as amended by resolution adopted on the seventh of June, two thousand five, be, and the same hereby is, further amended, to be printed together with explanatory notes, as follows:

ARTICLE 81

FOOD PREPARATION AND FOOD ESTABLISHMENTS

* * *

§81.49 Modification by Commissioner.

§81.50 Calorie labeling.

* * *

§81.51 Examination of most recent inspection report by patron or customer; posting sign.

Notes: The Table of Section Headings was further amended when a new §81.50 was added by resolution adopted on December 5, 2006 to require that food service establishments in New York City that sell food items whose portion size and content are standardized prominently display publicly available information about the calorie content of such items on menu boards and menus in an effort to facilitate patrons' nutritional choices at time of purchase.

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[1] Guthrie JF. et al. Role of Food Prepared Away from Home in the American Diet, 1977-78 Versus 1994-96: Changes and Consequences. *Society for Nutrition Education* 2002; 34:140-150.
[2] Flegal KM, Carroll MD, Ogden CL, Johnson CL. Prevalence and trends in obesity among U.S. adults, 1999-2000. JAMA 2002; 288:1723-1727.
[3] Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999-2004. JAMA 2006; 295:1549-1555.

[4] "One in 6 New York City Adults is Obese." *NYC Vital Signs*. NYCDOHMH. 2003. 2(7).
[5] "Obesity in Early Childhood: More than 40% of Head Start Children in NYC are Overweight or Obese." *NYC Vital Signs*. NYCDOHMH. 2006. 5(2).
[6] Thorpe LE. Mostashari F. Berger DK. Cobb LK. Helgerson SD. Frieden TR. Diabetes is Epidemic. *NYC Vital Signs* NYCDOHMH. 2003:2(1).
[7] Narayan KM. Boyle JP. Thompson TJ. Sorensen SW. Williamson DF. Lifetime Risk for Diabetes Mellitus in the United States. *Journal of the American Medical Association*. 2003. 290: 1884-1890.
[8] National Restaurant Association (NRA). "Industry at a Glance." 2005.
[9] Guthrie JF. et al. Role of Food Prepared Away from Home in the American Diet, 1977-78 Versus 1994-96: Changes and Consequences. *Society for Nutrition Education* 2002; 34:140-150.
[10] Zoumas-Morse C. et al. Children's Patterns of Macronutrient Intake and Associations with Restaurant and Home Eating" Journal of the American Dietetic Association 2001. 101:923-925.
[11] US Department of Health and Human Services (US DHHS), Centers for Disease Control and Prevention, National Center for Health Statistics. *Healthy People 2000 Final Review*. 2001.
[12] Levy AS. Derby BM. The Impact of NLEA on Consumers: Recent Findings from FDA's Food Label and Nutrition Tracking System. Washington DC: Center for Food Safety and Applied Nutrition. Food and Drug Administration. 1996.
[13] Support for Nutrition Labeling in Fast Food and Other Chain Restaurants. *American Journal of Public Health*. Policy Statements. November 9, 2004. P. 28-29. URL: http://www.apha.org/legislative/policy/2004/2004-14.pdf
[14] Burton S. Creyer EH. et al. Attacking the obesity epidemic: the potential health benefits of providing nutrition information in restaurants. *Am J Public Health*. 2006; 96(9):1669-1675.
[15] Burton S. Creyer EH. What consumers don't know *can* hurt them: Consumer evaluations and disease risk perceptions of restaurant menu items. *The Journal of Consumer Affairs*. 2004; 38(1):121-145.
[16] Burton S. Creyer EH. What consumers don't know *can* hurt them: Consumer evaluations and disease risk perceptions of restaurant menu items. *The Journal of Consumer Affairs*. 2004; 38(1):121-145.
[17] Kozup JC. Creyer EH. Burton S. Making Healthful Food Choices: The Influence of Health Claims and Nutrition Information on Consumers' Evaluations of Packaged Food Products and Restaurant Menu Items. *Journal of Marketing*. 2003; 67:19-34.
[18] Burton S. Creyer EH. What consumers don't know *can* hurt them: Consumer evaluations and disease risk perceptions of restaurant menu items. *The Journal of Consumer Affairs*. 2004; 38(1):121-145.
[19] Center for Science in the Public Interest. Anyone's Guess: The need for nutrition labeling at fast-food and other chain restaurants. Washington, DC: Center for Science in the Public Interest, 2003.
[20] Harvard Forums on Health. Obesity as a Public Health Issue: A Look at Solutions. National Poll by Lake, Snell, Perry & Associates. June 2003.
[21] The Keystone Forum on Away-From-Home Foods: Opportunities for Preventing Weight Gain and Obesity. Final Report. *Food and Drug Administration*. May 2006. http://www.keystone.org/spp/documents/Forum_Report_FINAL_5-30-06.pdf.
[22] Adapted from Backstrand J. Wootan MG. Young LR. Hurley J. Fat Chance. Washington, DC: Center for Science in the Public Interest, 1997.

S: HC 81.50 adopt

EXHBIT 11

FILE HP
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C Draft
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American Academy of Pediatrics

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October 6, 2006

Thomas R. Frieden, MD MPH
Commissioner of Health
New York City Department of Health and Mental Hygiene
125 Worth Street
New York, NY 10013

(Lufe)

Dear Dr. Frieden:

The American Academy of Pediatrics enthusiastically supports the proposed amendments to Article 81 of the New York City Health Code recently proposed by the New York City Department of Health and Mental Hygiene. These two proposed amendments, one restricting the sale and distribution of foods containing artificial trans-fats in New York City restaurants, and the second requiring food service establishments that routinely make nutritional information publicly available to post caloric information for consumers at the time of purchase, are both important public health initiatives that will have desirable consequences for the health of New York City residents.

As has been noted by the sponsors of proposed amendment §81.08 to Article 81 of the Health Code, the consumption of foods containing trans-fats (or partially hydrogenated vegetable oils) has been linked to the development of atherosclerotic heart disease. The restriction of the sale of trans-fats is therefore designed to remove a known risk factor for the development of coronary artery disease in adults. Those of us charged with the health and well-being of children and adolescents are well aware, however, that the precursors for this condition in adults emerge early in childhood.[1] In addition, as with adults, recent trends confirm that a higher percent of total calories consumed by children and adolescents is coming from food prepared away from home.[2] Moreover, patterns of food consumption begin quite early. It has been estimated that by 19-24 months of age, French fries are the most commonly consumed vegetable, one third of children eat no fruit whatsoever, while fully 60% are being fed baked desserts.[3] Since the vast majority of trans-fats are found in commercially prepared fried and baked goods, these eating patterns predispose even very young toddlers to the ingestion of trans-fats as regular elements of their diet. A sound approach to the threat posed by these conditions includes regular dietary counseling as part of routine primary care in the office

setting combined with innovative public health interventions that promote healthy eating patterns. As professionals who interact every day with parents concerned about their children's health, we recognize the importance of both of these strategies and applaud the New York City Department of Health and Mental Hygiene in its efforts to have food service establishments restrict the amount of trans-fats included in the foods they sell. There are healthy substitutes for these substances that are equally flavorful, easily obtained, and as economical. By restricting foods containing trans-fats, the Department of Health and Mental Hygiene will have taken an historic step in the direction of improving the cardiovascular health of all New Yorkers.

The second proposed amendment to the New York City Health Code, §81.50, is equally important to the health of children and receives our unqualified support as well. As is the case with other risk factors, epidemiologic evidence from longitudinal studies indicates that overweight and excess caloric intake among other risk factors track from childhood to adult life.[4,5] It is also well known that the twin epidemics of obesity and type II diabetes are becoming more severe even in the young pediatric age group over time,[6] particularly in areas such as New York City where recent estimates have indicated that one fifth of kindergarteners are obese.[7] As with the issue of trans-fat consumption, we believe that addressing the problem of excess caloric intake in the pediatric population must be a multi-pronged approach. As has recently been stated in a Policy Statement from the American Academy of Pediatrics when addressing a primary prevention approach to this issue:[8]

> *Education, with the support of the health care community, combined with health policy and environmental change to support optimal nutrition and physical activity, are central to this health strategy.*

In order for parents and young people to be able to make wise decisions concerning which foods they consume when dining out, it is imperative that information be provided to them about the caloric content of the foods they are purchasing *at the time* they are making their decisions about what to buy. Such information, clearly displayed at the time of purchase, will, when combined with the messages conveyed at primary care visits, enable parents and their children to modulate their intake of high calorie items containing large quantities of fats and carbohydrates. Parents routinely struggle when trying to resist the effects of well-financed food-related messages in print and electronic media that daily attempt to influence their children's food

purchases. Any aid that we can provide these parents that will help guide their choice of foods toward more nutritious alternatives constitutes an important public health intervention. We at the American Academy of Pediatrics therefore enthusiastically endorse the decision of the New York City Department of Health and Mental Hygiene to require food service establishments that routinely make public the calorie content of their menu items to post this information on menu boards and menus as proposed in amendment §81.50.

We believe that government can and should play an important role in addressing public health issues. We agree with Institute of Medicine's recent report on the prevention of childhood obesity which stated:[9]

> *Government at all levels serves several vital functions in a national public health crisis such as the childhood obesity epidemic. Government demonstrates leadership by establishing the childhood obesity epidemic as an urgent public health priority and coordinating the public- and private-sector response.*

Chapters 2 and 3 of District II of the American Academy of Pediatrics have historically recognized the vital role played by the New York City Department of Health and Mental Hygiene in promoting the health of New York City residents through a variety of critical activities. The two proposed amendments to the New York City Health Code are very much in keeping with this rich tradition and we are very pleased to join with the Department in support of their adoption.

Sincerely,

Anthony Battista, MD, FAAP
President, NY Chapter 2, AAP

Benard Dreyer, MD, FAAP
President, NY Chapter 3, AAP

Abraham Jelin, MD, FAAP
Co-Chair, NYC Youth Adv. Com.
NY Chapters 2 and 3, AAP

Andrew Racine, MD, PhD, FAAP
Co-Chair, NYC Youth Adv. Com.
NY Chapters 2 and 3, AAP

[1] Berenson GS, Srinivasan SR, Bao W, Newman WP 3rd, Tracy RE, Wattigney WA. Association between multiple cardiovascular risk factors and atherosclerosis in children and young adults. The Bogalusa Heart Study. *N Engl J Med.* 1998; 338: 1650-1656.

[2] Guthrie JF, Lin BH, Frazao E. Role of food prepared away from home in the American diet, 1977-78 versus 1994-96: changes and consequences. *J Nutr Educ Behav.* 2002;34:140-150.

[3] Fox MK, Pac S, Devaney B, Jankowski L. Feeding infants and toddlers study: what foods are infants and toddlers eating? *J Am Diet Assoc.* 2004; 104(1 suppl 1): s22-230.

[4] Whitaker RC, Wright JA, Pepe MS, Seidel KD, Dietz WH. Predicting obesity in young adulthood from childhood and parental obesity. *N Engl J Med.* 1997; 337: 869-873.

[5] Feunekes GI, de Graaf C, Meyboom S, van Staveren WA. Food choice and fat intake of adolescents and adults: associations of intakes within social networks. *Prev Med.* 1998; 27: 645-656.

[6] Mei Z, Scanlon KS, Grummer-Strawn LM, Freedman DS, Yip R, and Trowbridge FL. Increasing prevalence of overweight among low-income preschool children: the Centers for Disease Control and Prevention Pediatric Nutrition Surveillance, 1983-1995. Pediatrics 1998; 101 (1). URL: http://www.pediatrics.org/cgi/content/full/101/1/e12.

[7] Obesity in Early Childhood: More than 40% of Head Start Children in NYC are Overweight or Obese. NYC Vital Signs. NYCDOHMH. 2006. 5(2).

[8] American Heart Association, Gidding SS, Dennison BA, Birch LL, Daniels SR, Gillman MW, Lichtenstein AH, Rattay KT, Steinberger J, Stetler N, Van Horn L. Dietary recommendations for children and adolescents: A guide for practitioners. *Pediatrics* 2006: 117: 544-559.

[9] Koplan JP, Liverman CT, Kraak VI, Wisham SL, eds. Committee on Progress in Preventing Childhood Obesity. *Progress in Preventing Childhood Obesity: How do we Measure up?* Institute of Medicine of the National Academies. Washington, D.C.: National Academies Press. 2006.

American Cancer Society

To:	**Rena Bryant**
	Department of Health and Mental Hygiene, Board of Health
Via Fax:	**212-788-4315**
Via Email:	**RESOLUTIONCOMMENTS@HEALTH.NYC.GOV**
Re:	**Testimony of the American Cancer Society, Eastern Division (NY and NJ) In Support of Proposed Amendment (§81.50) to the New York City Health Code Requiring Calorie Labeling in Food Service Establishments**
Date:	**October 30, 2006**

The American Cancer Society, Eastern Division applauds the efforts of the New York City Board of Health in proposing this important policy initiative to help address the urgent problem of obesity. The following comments are focused on the proposal to require calorie labeling in food service establishments.

Obesity is a major epidemic with serious implications for the health and economic status of our country and New York City. While most know that excess pounds raise the risk of heart disease, hypertension, diabetes, stroke, and other fatal health problems, few are aware of the linkage between obesity and cancer. It is currently estimated that 14% of cancer deaths among males and 20% of deaths among females are attributed to obesity (Calle et al., 2003). Consequently, more than 2250 New York City residents die each year from preventable obesity-related cancers. National health care expenditures are estimated at $70 to $100 billion per year and are expected to grow with the increasing rates of overweight and obesity (Olshansky, 2005). Healthcare costs are 56% higher for obese persons compared to normal weight persons. This puts significant financial pressure on Medicaid and the New York City budget since obesity is approximately twice as high in low-income populations compared to higher income groups (Willet and Domolky, 2003). CDC's Pediatric Nutrition Surveillance Study of 2002 found that New York State has the 3rd highest rate of low-income overweight children in the country.

Every five years the American Cancer Society issues Nutrition and Physical Activity Guidelines for Cancer Prevention. A national panel of experts in cancer research, prevention, epidemiology,

public health, and policy develops the Guidelines, and as such, they represent the most current scientific evidence related to dietary and activity patterns and cancer risk. Given the evidence regarding obesity, the current Guidelines released September 28, 2006 (listed below), reflect an increased emphasis on weight control.

ACS Recommendations for Individual Choices

1. Maintain a healthy weight throughout life.
   - Balance caloric intake with physical activity.
   - Avoid excessive weight gain throughout the life cycle.
   - Achieve and maintain a healthy weight if currently overweight or obese.
2. Adopt a physically active lifestyle.
3. Consume a healthy diet, with an emphasis on plant sources.
4. If you drink alcoholic beverages, limit consumption.

Community efforts are essential to create a social environment that promotes healthy food choices and physical activity. Therefore, the ACS Guidelines also include a key recommendation for community action to accompany the four recommendations for individual choices to reduce cancer risk. This recommendation for community action recognizes that a supportive social environment is indispensable if individuals at all levels of society are to have genuine opportunities to choose healthy behaviors.

ACS Recommendations for Community Action

Public, private, and community organizations should work to create social and physical environments that support the adoption and maintenance of healthful nutrition and physical activity behaviors.

- Increase access to healthful foods in schools, worksites, and communities.

The American Cancer Society strongly supports the addition of Article §81.50 to the New York City Health Code. This proposal to require calorie labeling is consistent with the ACS guidelines and would help create the environmental changes needed to impact the current trend in obesity.

Like other voluntary health organizations, ACS disseminates nutrition guidelines in order to empower individuals with information to make informed decisions. However, the information must be readily available when the purchase decision is being made. People have grown accustomed to having nutrition information on packaged foods in supermarkets (3/4 of people report using labels) and they want it on menus as well. A recent, industry-sponsored poll showed that 83% of Americans want restaurants to provide nutrition information. Menu labeling legislation has been introduced in 17 states and cities across the country, as well as in the U.S. Congress.

In addition to providing consumers with information to help them make informed decisions, menu labeling would provide an incentive for restaurants to add new menu items and reformulate existing options to reduce the calories. We saw this happen when Nutrition Facts labels went on packaged foods in 1994 and we see it now with companies lowering or eliminating trans fats in response to the FDA requiring trans fat labeling.

With approximately half of the food dollar now being spent away from home (almost doubling since 1970), it is appropriate to make caloric information visible in restaurants where foods are typically higher in fat, calories, and larger portion sizes prevail (Finkelstein et al, 2004). Since the proposed labeling amendment applies to restaurants with standard menus that already make nutrition information available, most fast food chains will need to post the caloric content of foods. This is a desirable change since one study found that children who ate fast food obtained from 29 percent to 38 percent of their total energy intake from that source and ate more total fat, more saturated fat, more total carbohydrate, more added sugars, more sweetened beverages, less fluid milk, and fewer fruits and non-starchy vegetables than those who did not. The same study estimated that on a typical day nearly one third of children in the U.S. eat fast food (adolescents visit a fast-food outlet twice per week on average) and that these extra calories pack on an extra six pounds per child per year. Parents especially deserve to have more easily viewed caloric information to compare menu items and inform their food purchases outside the home.

Further, people need calorie labeling information because it is difficult to estimate the calories in restaurant meals. A study conducted by the Center for Science in the Public Interest and New York University found that even well-trained nutrition professionals couldn't estimate the calorie

content of typical restaurant meals. They consistently underestimated calorie amounts and the underestimates were substantial – by 200 to 600 calories. For example, when shown a display of a typical dinner-house hamburger and onion rings, the dietitians estimated that it had 865 calories, when it actually contained about 1,500 calories. If trained nutrition professionals can't estimate the calories in restaurant meals, an average consumer doesn't stand a chance.

The current provision of nutrition information, although inadequate, does show that providing nutrition information for restaurant foods is feasible, practical, and affordable. If a company can provide nutrition information on a website, or behind a counter, it should be able to put calorie numbers on their menus, where people can see them and use them when ordering.

We have seen in the fight against tobacco the substantial benefits of taking an aggressive policy-based approach that makes it easier to pursue healthier behaviors while creating barriers to unhealthy practices. In the early years of tobacco control, some states such as California and Massachusetts implemented a variety of population-based interventions although the efficacy was not clear. It was only these initial "real-world" efforts, evaluated and proven successful, that led to best practices being disseminated to other states. Like lessons learned in tobacco, strategies such as the proposed labeling provision, should be part of a comprehensive approach to address obesity and the many factors contributing to the problem. Fortunately, New York City has already implemented other citywide changes such as improving the school lunch program.

Finally, the National Academies' Institute of Medicine recommends that restaurant chains "provide calorie content and other key nutrition information on menus and packaging that is prominently visible at point of choice and use" (2006). The Food and Drug Administration, Surgeon General, and U.S. Department of Health and Human Services also recommend providing nutrition information at restaurants.

The American Cancer Society supports the significant step proposed by the City of New York as part of a comprehensive approach to addressing obesity, and we believe it is likely to promote reductions in obesity and cancer. We urge the adoption of Proposed Amendment §81.50 to the New York City Health Code.

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American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention: Reducing the Risk of Cancer With Healthy Food Choices and Physical Activity*

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ABSTRACT The American Cancer Society (ACS) publishes Nutrition and Physical Activity Guidelines to serve as a foundation for its communication, policy, and community strategies and ultimately, to affect dietary and physical activity patterns among Americans. These Guidelines, published every 5 years, are developed by a national panel of experts in cancer research, prevention, epidemiology, public health, and policy, and as such, they represent the most current scientific evidence related to dietary and activity patterns and cancer risk. The ACS Guidelines include recommendations for individual choices regarding diet and physical activity patterns, but those choices occur within a community context that either facilitates or interferes with healthy behaviors. Community efforts are essential to create a social environment that promotes healthy food choices and physical activity. Therefore, this committee presents one key recommendation for community action to accompany the four recommendations for individual choices to reduce cancer risk. This recommendation for community action recognizes that a supportive social environment is indispensable if individuals at all levels of society are to have genuine opportunities to choose healthy behaviors. The ACS Guidelines are consistent with guidelines from the American Heart Association and the American Diabetes Association for the prevention of coronary heart disease and diabetes, as well as for general health promotion, as defined by the Department of Health and Human Services' 2005 *Dietary Guidelines for Americans.* (*CA Cancer J Clin 2006;56:254–281.*)

THE IMPORTANCE OF WEIGHT CONTROL, PHYSICAL ACTIVITY, AND DIET IN CANCER PREVENTION

For the great majority of Americans who do not use tobacco, weight control, dietary choices, and levels of physical activity are the most important modifiable determinants of cancer risk.[1–3] Evidence suggests that one-third of the more than 500,000 cancer deaths that occur in the United States each year can be attributed to diet and physical activity habits, including overweight and obesity, while another third is caused by exposure to tobacco products. Although genetic inheritance influences the risk of cancer, and cancer arises from genetic mutations in cells, most of the variation in cancer risk across populations and among individuals is due to factors that are not inherited.[4] Behaviors

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such as avoiding exposure to tobacco products, maintaining a healthy weight, staying physically active throughout life, and consuming a healthy diet can substantially reduce one's lifetime risk of developing cancer.[5–8] These same behaviors are also associated with decreased risk of developing cardiovascular disease. Although these healthy choices are made by individuals, they may be facilitated or impeded by the social and physical environment in which people live.

OVERVIEW OF THE GUIDELINES

The ACS publishes Nutrition and Physical Activity Guidelines to advise health care professionals and the general public about dietary and other lifestyle practices that reduce cancer risk.[9,10] These Guidelines, updated in 2006 by the ACS Nutrition and Physical Activity Guidelines Advisory Committee, are based on synthesis of the current scientific evidence on diet and physical activity in relation to cancer risk. The Committee reviewed evidence from human population studies and laboratory experiments published since the last release of the Guidelines in 2001. The Committee also considered other comprehensive reviews of diet, obesity, and physical inactivity in relation to cancer. For some aspects of nutrition, the most thorough review was the 1997 World Cancer Research Fund/American Institute for Cancer Research monograph; for others, such as physical activity, obesity, and fruit and vegetable consumption, there have been more recent comprehensive reviews.[3,11,12] In weighing the evidence from randomized controlled trials (RCTs), the Committee considered the findings in relation to the design of the trial, the specific question being addressed, and the importance of the trial results in the context of other evidence from human populations. Prospective cohort studies were weighted more heavily than case-control studies, especially when results were available from several cohorts. Population-based case-control studies with at least 200 cases of cancer were considered more informative than smaller or hospital-based case-control studies. Studies that adjusted for total energy intake, considered other dietary factors, and controlled for other known risk factors were considered more credible than those that failed to meet these criteria.

For many issues concerning nutrition and cancer, the evidence is not definitive, either because the published results are inconsistent, and/or because the methods of studying nutrition and chronic disease in human populations are still in evolution. Part of the uncertainty has resulted from studies that focus on specific nutrients or foods in isolation, thereby oversimplifying the complexity of foods and dietary patterns; the importance of dose, timing, and duration of exposure; and the large variations in nutritional status among human populations. Nutritional research is equally challenging in RCTs, generally considered the gold standard for scientific conclusions. Studies may fail to find an effect if the intervention begins too late in life, is too small, or if the follow up is too short for a benefit to appear. No single trial can resolve all of the questions that are relevant to the potential effects of nutrition throughout the lifespan. Moreover, many important questions about how diet, physical activity, and obesity relate to cancer cannot presently be addressed in RCTs. For example, randomized trials of weight loss in relation to cancer risk are severely constrained by the current lack of effective behavioral or pharmacologic approaches to help people lose weight and sustain a healthy weight. The cost and difficulty of randomized trials to determine the long-term consequences of interventions that begin in infancy and extend for many years preclude long-term experimental interventions. Interventions are ethical only if they can plausibly improve the health of the participants. Although it might be easier to motivate people to increase their weight by consuming more calories and/or fat and by decreasing their physical activity, such studies are clearly unethical.

Inferences about the many complex interrelationships among body weight, physical activity, diet, and cancer risk are therefore based, for the most part, on a combination of clinical trials and observational studies coupled with advancing understanding of the biology of cancer. These Guidelines are based on the totality of evidence from all sources, taking into account both the potential health benefits and possible risks from the intervention. No diet or lifestyle pattern can

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TABLE 1 American Cancer Society (ACS) Guidelines on Nutrition and Physicial Activity for Cancer Prevention

ACS Recommendations for Individual Choices

Maintain a healthy weight throughout life.

- Balance caloric intake with physical activity.
- Avoid excessive weight gain throughout the life cycle.
- Achieve and maintain a healthy weight if currently overweight or obese.

Adopt a physically active lifestyle.

- Adults: engage in at least 30 minutes of moderate to vigorous physical activity, above usual activities, on 5 or more days of the week. Forty-five to 60 minutes of intentional physical activity are preferable.
- Children and adolescents: engage in at least 60 minutes per day of moderate to vigorous physical activity at least 5 days per week.

Consume a healthy diet, with an emphasis on plant sources.

- Choose foods and beverages in amounts that help achieve and maintain a healthy weight.
- Eat five or more servings of a variety of vegetables and fruits each day.
- Choose whole grains in preference to processed (refined) grains.
- Limit consumption of processed and red meats.

If you drink alcoholic beverages, limit consumption.

- Drink no more than one drink per day for women or two per day for men.

ACS Recommendations for Community Action

Public, private, and community organizations should work to create social and physical environments that support the adoption and maintenance of healthful nutrition and physical activity behaviors.

- Increase access to healthful foods in schools, worksites, and communities.
- Provide safe, enjoyable, and accessible environments for physical activity in schools, and for transportation and recreation in communities.

guarantee full protection against any disease; the potential health benefit represents a decreased likelihood that the disease will occur, not a guarantee of total protection. These Guidelines provide a concise and understandable summary of the existing scientific information about weight control, physical activity, and nutrition in relation to cancer. The ACS Guidelines are consistent with guidelines established for cancer prevention by other countries[8]; those from the American Heart Association and American Diabetes Association for the prevention of coronary heart disease and diabetes[13,14]; as well as for general health promotion, as defined by the *2005 Dietary Guidelines for Americans*.[15]

In addition to recommendations regarding individual choices related to weight control, physical activity, and diet, the ACS Guidelines underscore what communities can and should do to facilitate healthy eating and physical activity behaviors (Table 1). Community efforts are essential to create a social environment that promotes healthy food choices and physical activity. Thus, the recommendation for community action recognizes that a supportive social environment is indispensable if individuals at all levels of society are to have genuine opportunities to choose healthy behaviors.

AMERICAN CANCER SOCIETY GUIDELINES FOR NUTRITION AND PHYSICAL ACTIVITY

Recommendations for Community Action

Social, economic, and cultural factors strongly influence individual choices about diet and physical activity. Although many Americans would like to adopt a healthy lifestyle, many encounter substantial barriers that make it difficult to follow diet and activity guidelines. Indeed, current trends toward increasing portion sizes,[16–19] as well as the consumption of high-caloric convenience foods, beverages, and restaurant meals, and declining levels of physical activity are contributing to an obesity epidemic among Americans of all ages and across all population segments.[15,20,21] Longer workdays and more households with multiple wage earners reduce the amount of time available for preparation of meals, with a resulting shift toward increased consumption of high-calorie food outside the home—frequently less nutritious than foods prepared at home.[22] Large

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portion sizes and caloric-dense foods are used extensively in marketing by restaurants, supermarkets, and food companies.[16–19] Reduced leisure time, increased reliance on automobiles for transportation, and increased availability of electronic entertainment and communications media all contribute to reduced physical activity.[20,21] Increasing evidence indicates associations between the built environment and obesity and physical activity levels.[23,24] Poor access to sidewalks, parks, and recreation facilities is associated with greater obesity risk,[25] whereas neighborhoods that facilitate walking and safe physical recreation have lower obesity prevalence.[23]

The increase in obesity and physical inactivity is of particular concern for a number of population groups, including children, who are establishing lifetime behavioral patterns that affect health, and lower-income populations, who face additional problems because nearby stores often lack affordable and attractive healthy foods, and safety concerns limit opportunities for physical activity.

Facilitating improved diet and increased physical activity patterns in communities will require multiple strategies and bold action, ranging from the implementation of community, worksite, and other health promotion programs to policies that affect community planning, transportation, school-based physical education, and food services. Particular efforts will be needed to ensure that all population groups have access to healthy food choices and opportunities for physical activity. Public and private organizations at local, state, and national levels will need to develop new policies and to reallocate or expand resources to facilitate necessary changes. Health care professionals and community leaders, in particular, have new opportunities to provide leadership and to promote policy changes in their communities.

Lessons learned from the tobacco epidemic exemplify the power of social context in changing health behaviors. Adult per-capita cigarette consumption increased steeply from 1910 until 1964, when the first US Surgeon General Report publicized the health hazards of smoking. However, public education alone produced only a gradual decrease in cigarette consumption from 1964 through the early 1980s. It was the subsequent introduction of community-wide policy approaches that produced much larger reductions in cigarette smoking among children and adults, beginning in the mid-1980s. These included restrictions on cigarette advertising, increases in the price of tobacco products through taxation, laws preventing exposure to secondhand smoke in public places, and restrictions on the access of children to tobacco products. Only recently have communities begun to consider policy approaches that might promote better nutrition and physical activity at the population level. Public, private, and community organizations are now considering policy measures and strategies that could help individuals choose healthier patterns of nutrition and physical activity (Table 1).

Recommendations for Individual Choices

Approximately two-thirds of Americans are overweight or obese. The percentage of children, adolescents, and adult men who are overweight or obese has continued to increase through 2004, although the trend has now stabilized in adult women.[26] In addition, many Americans are less physically active than is optimal for health. There is no longer serious medical debate about whether obesity, the prevalence of which has doubled in the last 25 years, constitutes a major health problem in the United States, increasing the risk of several cancers as well as of coronary heart disease, type 2 diabetes, and other medical problems. For most people in the United States, weight gain results from a combination of excessive caloric intake and inadequate physical activity. Thus, while there continues to be genuine scientific uncertainty about how specific aspects of excess adiposity, excessive energy intake, and physical inactivity relate to cancer, there is no debate about whether these constitute a serious and growing health problem. These Guidelines therefore emphasize the importance of maintaining a healthy body weight, adopting a physically active lifestyle, and consuming a healthy diet, particularly within the context of weight management.

1. Maintain a Healthy Weight Throughout Life.

- Balance caloric intake with physical activity.
- Avoid excessive weight gain throughout the life cycle.

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TABLE 2 Adult BMI Chart

BMI	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Height	Weight in Pounds																
4'10"	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167
4'11"	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173
5'	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179
5'1"	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185
5'2"	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191
5'3"	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197
5'4"	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204
5'5"	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210
5'6"	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216
5'7"	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223
5'8"	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230
5'9"	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236
5'10"	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243
5'11"	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250
6'	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258
6'1"	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265
6'2"	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272
6'3"	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279
	Healthy Weight						Overweight					Obese					

Source: US Department of Health and Human Services, National Institutes of Health, National Health, Lung, and Blood Institute. The Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults: Evidence Report. September 1998 [NIH pub. No. 98-4083].

- Achieve and maintain a healthy weight if currently overweight or obese.

Body Weight and Cancer Risk

In the United States, overweight and obesity contribute to 14% to 20% of all cancer-related mortality.[27] Overweight and obesity are clearly associated with increased risk for developing many cancers, including cancers of the breast in postmenopausal women,[3,27–33] colon, endometrium, adenocarcinoma of the esophagus, and kidney. Evidence is highly suggestive that obesity also increases risk for cancers of the pancreas, gallbladder, thyroid, ovary, and cervix, and for multiple myeloma, Hodgkin lymphoma, and aggressive prostate cancer.[3,27–33] These findings are supported by both epidemiologic studies in humans and other research.[3,27–33] Overweight and obesity are thought to affect risk of these cancers through a variety of mechanisms, some of which are specific to particular cancer types. These mechanisms include effects on fat and sugar metabolism; immune function; levels of several hormones, including insulin and estradiol; factors that regulate cell proliferation and growth, such as insulin-like growth factor-1; and proteins that make hormones more or less available to tissues, such as sex hormone-binding globulin.[3] Overweight and obesity may increase risk of adenocarcinoma of the esophagus by increasing risk of gastroesophageal reflux disease and Barrett's esophagus.[3]

Most research on energy imbalance and cancer focuses on increased risks associated with overweight and obesity. Recently, studies exploring intentional weight loss suggest that losing weight may reduce the risk of breast cancer.[34–38] Surgery to treat morbid obesity and short-term intentional weight loss have been shown to improve insulin sensitivity and biochemical measures of hormone metabolism, which have been postulated to contribute to the relationship between obesity and certain cancers. The surgical removal of intra-abdominal fat has also been shown to reduce the metabolic syndrome. Even though our knowledge about the relationship between weight loss and cancer risk is incomplete, individuals who are overweight or obese should be encouraged and supported in their efforts to reduce weight.

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Achieving and Maintaining a Healthy Weight

A healthy weight depends on a person's height, so recommendations for a healthy weight are often expressed in terms of a body mass index (BMI) (Table 2). BMI is calculated as body weight in kilograms divided by height in meters, squared.[2] Exact cutoffs for a healthy weight are somewhat arbitrary, but for most Americans, experts consider a BMI within the range of 18.5 to 25.0 kg/m^2 to be healthy, a BMI between 25.0 and 29.9 to be overweight, and a BMI of 30.0 and over to be obese. Individuals should strive to maintain healthy weights as illustrated in Table 2.

The way to achieve a healthy body weight is to balance energy intake (food and beverage intake) with energy expenditure (physical activity).[3,15] Excess body fat can be reduced by reducing caloric intake and increasing physical activity. For most adults a reduction of 50 to 100 calories per day may prevent gradual weight gain, whereas a reduction of 500 calories or more per day is a common initial goal in weight loss programs. Similarly, up to 60 minutes of moderate to vigorous intensity physical activity per day may be needed to prevent weight gain, but as much as 60 to 90 minutes of moderate intensity physical activity per day may help to sustain weight loss for previously overweight people.[15] The healthiest way to reduce caloric intake is to reduce intake of added sugars, saturated and trans fats, and alcohol, which all provide substantial calories, but few or no essential nutrients. Caloric intake can be reduced by decreasing the size of food portions (see standard serving sizes [Table 3]) and limiting the intake of foods and beverages that are high in calories, fat, and/or refined sugars, and which provide few nutrients (eg, fried foods, cookies, cakes, candy, ice cream, and soft drinks). Such foods and beverages should be replaced with choices like vegetables and fruits, whole grains, beans, and lower-calorie beverages.[39] People should be aware that meals served in fast-food establishments and restaurants typically exceed the portion sizes needed to meet recommended daily caloric intake and are often high in hidden fats.[39] They also are often low in vegetables, fruits, whole grains, and beans.[22] Monitoring food intake and physical activity has been shown to be effective in weight management.[19,39,40]

TABLE 3 What Counts as a Serving

Fruits	• 1 medium apple, banana, orange • 1/2 cup of chopped, cooked, or canned fruit • 1/2 cup of 100% fruit juice
Vegetables	• 1 cup of raw leafy vegetables • 1/2 cup of other cooked or raw vegetables, chopped • 1/2 cup of 100% vegetable juice
Grains	• 1 slice bread • 1 ounce ready-to-eat cereal • 1/2 cup of cooked cereal, rice, pasta
Beans and nuts	• 1/2 cup cooked dry beans • 2 tablespoons peanut butter • 1/3 cup nuts
Dairy foods and eggs	• 1 cup milk or yogurt • 1 1/2 ounces of natural cheese • 2 ounces processed cheese • 1 egg
Meats	2–3 ounces of cooked lean meat, poultry, fish

The health of young people, and the adults they will become, is critically linked to the establishment of healthy behaviors in childhood.[41] Risk factors such as excess weight gain, unhealthy dietary patterns, and physical inactivity during childhood and adolescence can result in increased risk of developing cancer, cardiovascular disease, diabetes, hypertension, and osteoporosis later in life.[41] Children who adopt healthy lifestyle habits at an early age are more likely to continue these behaviors throughout life. About half of youngsters who are overweight as children will remain overweight in adulthood[42]; 70% of those who are overweight by adolescence will remain overweight as adults.[18] For these reasons, efforts to establish healthy weight and patterns of weight gain should begin in childhood.

2. Adopt a Physically Active Lifestyle.

- Adults: engage in at least 30 minutes of moderate to vigorous physical activity, above usual activities, on 5 or more days of the week. Forty-five to 60 minutes of intentional physical activity are preferable.
- Children and adolescents: engage in at least 60 minutes per day of moderate to vigorous physical activity at least 5 days per week.

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Benefits of Physical Activity

Scientific evidence indicates that physical activity may reduce the risk of several types of cancer, including cancers of the breast, colon, prostate, and endometrium.[3,29,43] Although scientific evidence for many other cancers is lacking, associations may exist. Physical activity acts in a variety of ways to impact cancer risk.[44] Regular and intentional physical activity helps maintain a healthy body weight by balancing caloric intake with energy expenditure.[45] Other mechanisms by which physical activity may help to prevent certain cancers may involve both direct and indirect effects, including regulating sex hormones, insulin, prostaglandins, and various beneficial effects on the immune system.[3,46,47] The benefits of a physically active lifestyle far exceed reducing the risk of cancer and provide other important health benefits,[3] including associations with reduced risk of other chronic diseases, such as heart disease, diabetes, osteoporosis, and hypertension.[48]

Types of Activity

Usual activities are those that are performed on a regular basis as part of one's daily routine. These activities include those performed at work (such as walking from the parking garage to the office), at home (such as climbing a flight of stairs), as well as those considered activities of daily living (such as dressing and bathing). They are typically of low intensity and short duration. Intentional activities are those that are done in addition to these usual activities. These activities are often planned and often done at leisure, for exercise, for fitness, or transportation to intentionally supplement other routine activities. These activities range from a bike ride or a run to including more purposeful physical activity into the day, such as walking to use public transportation instead of driving. Moderate activities are those that require effort equivalent to a brisk walk.[49] Vigorous activities generally engage large muscle groups and cause a noticeable increase in heart rate, breathing depth and frequency, and sweating.[49] These activities can be performed in a variety of settings: occupational, recreational, in the home or garden, and with friends or family.[49]

Recommended Amount of Total and Intentional Activity

Although the optimal intensity, duration, and frequency of physical activity needed to reduce cancer risk are unknown, evidence suggests that at least 30 minutes of moderate to vigorous activity, in addition to usual activities done throughout the day, can help reduce cancer risk. Evidence is accumulating that 45 to 60 minutes on 5 or more days of the week may be optimal to reduce risk of cancers of the colon and breast.[3] There is limited evidence regarding whether physical activity is most protective if done in a single session or in increments throughout the day, but it is reasonable to assume that benefit can be accumulated in separate sessions of 20 to 30 minutes each.

Data suggest that 60 minutes of moderate to vigorous activity on 5 or more days per week helps to prevent weight gain and obesity.[15,50] By helping to maintain weight, physical activity for 60 minutes on 5 or more days of the week may have an indirect effect on reducing the risk of developing obesity-related cancers.[51–55] Apart from effects on obesity, physical activity appears to have other effects on reducing the risk of cancers of the colon and breast, even when activity is not initiated until later in life.[55]

For people who are largely inactive or just beginning a physical activity program, a gradual increase to 30 minutes per day of moderate intensity physical activity on at least 5 days per week will provide substantial cardiovascular benefits.[56,57] After this duration is achieved, increasing intensity to vigorous levels may further improve health benefits for those individuals who are able to exercise at this intensity. Most children and young adults can safely engage in moderate physical activity without consulting their physicians. However, men older than 40 years, women older than 50 years, and people with chronic illnesses and/or established cardiovascular risk factors should consult their physicians before beginning a vigorous physical activity program. Stretching and warm-up periods before and after activity can reduce the risk of musculoskeletal injuries and muscle soreness.

Individuals who are already active at least 30 minutes on most days of the week should strive

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TABLE 4 Examples of Moderate and Vigorous Intensity Physical Activities

	Moderate Intensity Activities	Vigorous Intensity Activities
Exercise and leisure	Walking, dancing, leisurely bicycling, ice and roller skating, horseback riding, canoeing, yoga	Jogging or running, fast bicycling, circuit weight training, aerobic dance, martial arts, jumping rope, swimming
Sports	Volleyball, golfing, softball, baseball, badminton, doubles tennis, downhill skiing	Soccer, field or ice hockey, lacrosse, singles tennis, racquetball, basketball, cross-country skiing
Home activities	Mowing the lawn, general yard and garden maintenance	Digging, carrying and hauling, masonry, carpentry
Occupational activity	Walking and lifting as part of the job (custodial work, farming, auto or machine repair)	Heavy manual labor (forestry, construction, firefighting)

to accumulate 60 minutes of moderate or greater intensity activity on most days of the week. Selected examples of moderate and vigorous activities are provided in Table 4.

Adopting a physically active lifestyle involves making deliberate decisions and changing lifestyle behaviors to select active rather than sedentary behavior. To enhance the ability of individuals to adopt a more active lifestyle, both communities and individuals need to implement changes (see *Recommendation for Community Action*). Ideas to reduce sedentary behavior are suggested in Table 5.

Physical activity plays an important role in children's and adolescents' health and well-being and has important physical, mental, and social benefits.[15,58,59] Because one of the best predictors of adult physical activity is activity level during childhood and adolescence, and because physical activity plays a critical role in weight maintenance, children and adolescents should be encouraged to be physically active at moderate to vigorous intensities for at least 60 minutes per day on 5 or more days per week.[60,61] Activities should be developmentally appropriate, enjoyable, and varied,[59] including sports and fitness activities in school, at home, and in the community.[62] Because children and adolescents spend a significant portion of their days in schools, the availability of routine, high-quality physical education programs is a critically important and recognized way of increasing physical activity among youth.[62] To help achieve activity goals, daily physical education programs and activity breaks should be provided for children at school, and television viewing and computer game time should be minimized at home.

Although the health benefits of physical activity in preventing cancer and other chronic diseases are facilitated by the development of healthy activity patterns in childhood, benefit seems to accumulate over the course of a lifetime.[6] Therefore, increasing the level of physical activity at any age can provide important health benefits and may reduce the risk of some cancers.

TABLE 5 Suggested Ways to Reduce Sedentary Behavior

- Use stairs rather than an elevator.
- If you can, walk or bike to your destination.
- Exercise at lunch with your coworkers, family, or friends.
- Take an exercise break at work to stretch or take a quick walk.
- Walk to visit coworkers instead of sending an e-mail.
- Go dancing with your spouse or friends.
- Plan active vacations rather than only driving trips.
- Wear a pedometer every day and increase your daily steps.
- Join a sports team.
- Use a stationary bicycle or treadmill while watching TV.
- Plan your exercise routine to gradually increase the days per week and minutes per session.
- Spend time playing with your kids.

3. Consume a Healthy Diet, with an Emphasis on Plant Sources.

Choose foods and beverages in amounts that help achieve and maintain a healthy weight.

- Become familiar with standard serving sizes, and read food labels to become more aware of actual servings consumed.
- Eat smaller portions of high-calorie foods. Be aware that "low-fat" or "nonfat" does not mean "low-calorie," and that low-fat cakes, cookies, and similar foods are often high in calories.
- Substitute vegetables, fruits, and other low-calorie foods and beverages for calorie-dense

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foods and beverages such as French fries, cheeseburgers, pizza, ice cream, doughnuts and other sweets, and regular sodas.
- When you eat away from home, choose food low in calories, fat, and sugar, and avoid large portion sizes.

Eat five or more servings of vegetables and fruits each day.
- Include vegetables and fruits at every meal and for snacks.
- Eat a variety of vegetables and fruits each day.
- Limit French fries, chips, and other fried vegetable products.
- Choose 100% juice if you drink vegetable or fruit juices.

Choose whole grains in preferences to processed (refined) grains and sugars.
- Choose whole grain rice, bread, pasta, and cereals.
- Limit consumption of refined carbohydrates, including pastries, sweetened cereals, and other high-sugar foods.

Limit consumption of processed and red meats.
- Choose fish, poultry, or beans as an alternative to beef, pork, and lamb.
- When you eat meat, select lean cuts and eat smaller portions.
- Prepare meat by baking, broiling, or poaching rather than by frying or charbroiling.

The scientific study of nutrition and cancer is highly complex, and many important questions remain unanswered. For example, it is not presently completely understood how energy imbalance or how single or combined nutrients or foods affect one's risk of specific cancers. In addition, many dietary factors and lifestyle practices tend to correlate with each other; for example, people who consume a diet high in vegetables and fruits also tend to eat less meat and be more physically active.[63] Foods and nutrients may have additive or synergistic effects on health and need to be considered in the context of the total diet. Studies have shown that individuals whose diets are very low in vegetables and fruits and whole grains, and high in processed and red meats, tend to have an increased risk of some of the most common types of cancers.[64,65] Until more is known about the specific components of diet that influence cancer risk, the best advice is to consume whole foods following an overall healthy dietary pattern as outlined, with special emphasis placed on controlling total caloric intake to help achieve and maintain a healthy weight.

Choosing Foods and Beverages in Amounts That Achieve and Maintain a Healthy Weight

Most people cannot maintain a healthy weight without limiting caloric intake while maintaining regular physical activity. Unfortunately, current trends indicate that the largest percentage of calories in the American diet comes from foods high in fat, sugar, and refined carbohydrates.[66] Consuming a varied diet that emphasizes plant foods may help to displace these calorie-dense foods. Limiting portion sizes, especially of these types of foods, is another important strategy to reduce total caloric intake.

Replacing dietary fat with foods that are high in calories from added sugar and other refined carbohydrates does not protect against overweight or obesity. The decrease in fat intake and increase in refined carbohydrates that occurred in the United States between 1977 and 1995 coincided with an 8% increase in the prevalence of obesity.[67,68] Many processed foods, including soft drinks and fruit drinks, presweetened cereals, pastries, candies, and syrups, contain large amounts of added sugars. These added sugars come in many forms, such as glucose, high-fructose corn syrup, fruit juice concentrates, and honey. Consuming products high in these added sugars adds little nutrient value to the diet, contributes to excess energy intake, and may contribute to insulin resistance, alterations in the amount and distribution of body fat, and increased concentrations of growth factors that may promote the growth of cancers.

Vegetables and Fruits

Vegetables (including legumes) and fruits are complex foods, each containing numerous potentially beneficial vitamins, minerals, fiber, carotenoids, and other bioactive substances, such as flavonoids, terpenes, sterols, indoles, and phenols that may help prevent cancer.[11] Greater consumption of vegetables and fruits is associated with decreased risk of lung, esophageal, stomach, and colorectal cancer.[11] For other cancers, evidence is either limited or inconsistent, although the role of vegetables and fruits may indirectly

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influence cancer risk via their effects on energy intake. Intervention studies of dietary patterns, including high consumption of vegetables and fruits, have not been associated with a reduced risk of developing adenomatous polyps[69] or colon cancer,[70] but the degree of adherence to and achievement of study goals over several years among free-living individuals may limit interpretability. Although the strength of the cumulative evidence that total intake of vegetables and/or fruits decreases cancer risk has weakened in recent years, the totality of the evidence remains strong for a risk reduction associated with vegetable and fruit consumption at a variety of cancer sites.[11] There is ongoing research on the potential benefits of particular vegetables and fruits, or groups of these, including dark green and orange vegetables, cruciferous vegetables (eg, cabbage, broccoli, cauliflower, Brussels sprouts), soy products, legumes, *Allium* vegetables (onions and garlic), and tomato products.

In addition to providing nutrients that may be beneficial in reducing cancer risk, vegetables and fruits may also contribute to weight maintenance, although the epidemiologic evidence supporting such an association is limited.[71] Some evidence suggests that individuals who eat more vegetables and fruits have less weight gain and lower risk of developing obesity over time.[72] Intake of vegetables and fruits may be particularly important if their consumption replaces other, more calorically dense foods as a strategy for maintaining a healthy weight. For that reason, consumption of low-calorie, whole vegetables and fruits should be encouraged. Consumption of vegetables and fruits that are fried (eg, French fries) or consumed with calorically dense sauces (eg, broccoli with cheese sauce), or high-calorie fruit juices and/or drinks does not help achieve this objective.

Evidence that vegetable and fruit consumption reduces cancer risk has led to attempts to isolate specific nutrients and administer them as supplements, sometimes in very high doses.[73] Most of these attempts have been unsuccessful in preventing cancer or its precursor lesions, and in some cases, have had adverse effects.[73] Some of this may be due to the methodologic challenges of studying nutrients in RCTs for cancer; investigators must often select exact doses, duration, and timing of a single nutrient intervention, based on evidence derived from broader observational data on whole foods, like vegetables and fruits. Notable examples are the four randomized trials of beta carotene for the prevention of lung cancer, which were initiated because many observational epidemiologic studies had indicated a lower risk of lung cancer in persons eating foods high in beta carotene.[74,75] In two of these trials, the individuals taking high-dose beta carotene supplements developed lung cancer at higher rates than those taking a placebo.[76–78] Although there has been considerable evidence from observational studies that people consuming more beta carotene from foods were at reduced risk for lung cancer, these findings support the idea that beta carotene may be only a proxy for other single nutrients or combinations of nutrients found in whole foods, and that taking a single nutrient in large amounts can be harmful, at least for some subgroups of the population.

A number of different recommendations have been made to encourage Americans to increase the number of servings of vegetables and fruits they consume.[13,15,79] Despite these recommendations, intake of these foods remains low among adults and children.[80,81] This may be due to several reasons, including lack of access to affordable produce, preparation time, and taste preferences.[82–85]

Eating a diet rich in vegetables and fruits may reduce cancer risk both directly and indirectly by contributing to maintenance of a healthy weight.[11,71] Vegetable and fruit consumption has also been found to be associated with reduced risk of other chronic diseases, particularly cardiovascular disease, an important contributor to overall morbidity and mortality in the United States.[13,86–88] For cancer risk reduction, the recommendation is to consume at least five servings of a variety of vegetables and fruits each day; however, for overall health, the ACS supports the recommendation to consume higher levels, depending on calorie needs, as stated in the US Department of Health and Human Services' *Dietary Guidelines for Americans*.[15]

Whole Grains

Grains such as wheat, rice, oats, and barley, and the foods made from them, are an important

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part of an overall healthful diet. Whole grain foods, which are those made from the entire grain seed, are relatively low in caloric density and can contribute to maintaining energy balance.[15,89] In addition, whole grains are higher in fiber, certain vitamins, and minerals than processed (refined) flour products. Some of these vitamins and minerals have been associated with lower risk of cancer.[90] The association between whole grain foods and different types of cancer has been inconsistent, however, possibly because the questionnaires used in these studies to assess dietary intake were generally not specifically designed to assess whole grain consumption, which in most cases resulted in incomplete assessments.

Consumption of high-fiber foods is associated with a lower risk of several chronic diseases, including diabetes, cardiovascular disease, and diverticulitis.[15] Consuming high-fiber foods, such as legumes and whole grain breads, cereals, rice, and pasta, is therefore highly recommended, even though data for an association between fiber and cancer risk are limited.[69,91,92] Because the benefits of whole grain foods may derive from their other nutrients as well as fiber, it is preferable to consume whole grain foods rather than fiber supplements.

Processed and Red Meats

Many epidemiologic studies have examined the association between cancer and the consumption of red meats (defined as beef, pork, or lamb) and processed meats (cold cuts, bacon, hot dogs, etc.). Current evidence supports an increased risk of cancers of the colon and/or rectum[93–96] and prostate.[97,98] More limited evidence exists for other sites. Studies that have examined red meat and processed meat separately suggest that risks associated with processed meat may be slightly greater than red meat,[93–95,98] but the consumption of both should be limited.

Meat contains several constituents that could increase the risk of cancer.[97,99] Mutagens and carcinogens (heterocyclic amines and polycyclic aromatic hydrocarbons) are produced by cooking meat at high temperatures and/or by charcoal grilling. The iron content (heme) in red meat may generate free radicals in the colon that damage DNA. Substances used to process meat (nitrates/nitrites and salt) contribute to the formation of nitrosamines that can damage DNA. It is also possible that the fat content in meat contributes to risk. For example, foods that are high in fat increase the concentration of secondary bile acids and other compounds in the stool that could be carcinogens or promoters of carcinogenesis.

Although meats are good sources of high-quality protein and can supply many important vitamins and minerals, they remain major contributors of total fat, saturated fat, and cholesterol in the American diet.[100] The recommendation is to limit consumption of processed and red meats. To accomplish this, choose lean meats and smaller portions, and use meat as a side dish rather than as the focus of a meal. Legumes are especially rich in nutrients that may protect against cancer and can be a healthier source of protein than red meats. Although cooking meat at high temperatures, such as in grilling or frying, can produce potential carcinogens, care should be taken to cook meat thoroughly to destroy harmful bacteria and parasites, but to avoid charring.

4. If You Drink Alcoholic Beverages, Limit Consumption

People who drink alcohol should limit their intake to no more than two drinks per day for men and one drink a day for women.[15] The recommended limit is lower for women because of their smaller body size and slower metabolism of alcohol. A drink of alcohol is defined as 12 ounces of beer, 5 ounces of wine, or 1.5 ounces of 80-proof distilled spirits. Alcohol consumption is an established cause of cancers of the mouth, pharynx, larynx, esophagus, and liver.[5,101] For each of these cancers, risk increases substantially with intake of more than two drinks per day.[5,101] Alcohol consumption combined with tobacco increases the risk of cancers of the mouth, larynx, and esophagus far more than the independent effect of either drinking or smoking.[5] Extensive evidence also implicates alcohol consumption as a cause of cancer of the breast,[102–104] and probably colon and rectum cancer.[5,105] Regular consumption of more than one drink per day has been associated with an increased risk of breast cancer in women.[103] The mechanism by which alcohol is related to breast cancer is not known, but it may be due to alcohol-induced

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increases in circulating estrogens or other hormones in the blood, reduction of folate levels, or to a direct effect of alcohol or its metabolites on breast tissue. Reducing alcohol consumption may be an important way for many women to reduce their risk of breast cancer. In particular, women with a low intake of folate may be more susceptible to the increase in breast cancer risk from alcohol.[106–109] Overall, the evidence seems to indicate that total alcohol consumption is the important factor, not the type of alcoholic beverage consumed.[110]

Complicating the recommendation for alcohol and cancer risk reduction is the fact that low to moderate intake of alcoholic beverages has been associated with decreased risk of coronary heart disease.[102] Even though drinking moderate levels of alcohol is associated with reduced risk of coronary heart disease in women, those women who are at high risk of breast cancer might reasonably consider abstaining from alcohol. There is no compelling reason for adults who currently do not consume alcoholic beverages to start consuming alcohol to reduce their risk for heart disease, as cardiovascular risk can be reduced by other means, such as avoiding smoking, consuming a diet low in saturated and trans fats, maintaining a healthy weight, staying physically active on a regular basis, and controlling blood pressure and lipids. Furthermore, there is convincing evidence that cardiovascular risk increases with heavy alcohol consumption.[102] Some groups of people should not drink alcoholic beverages at all. These include children and adolescents; individuals of any age who cannot restrict their drinking to moderate levels or who have a family history of alcoholism; women who are or may become pregnant; individuals who plan to drive or operate machinery or who take part in other activities that require attention, skill, or coordination; and individuals taking prescriptions or over-the-counter medications that can interact with alcohol.

DIET AND PHYSICAL ACTIVITY FACTORS THAT AFFECT RISKS FOR SELECT CANCERS

Bladder Cancer

The major risk factors for bladder cancer are tobacco smoking and exposure to certain industrial chemicals. Limited evidence suggests that drinking more fluids may lower the risk of bladder cancer, as may eating more vegetables.[111]

Brain Tumors

There are no known nutritional risk factors for brain tumors at this time.

Breast Cancer

Breast cancer is the most common cancer diagnosed among American women and is second only to lung cancer as a cause of cancer deaths in women.[134] The risk of breast cancer is increased by several reproductive and other factors that are not easily modified: menarche before age 12, nulliparity or first birth at age greater than 30 years, late age at menopause, and a family history of breast cancer. Risk factors may differ for breast cancer that is diagnosed before or after menopause. New evidence indicates that exposures throughout life including in utero may have an effect on breast cancer risk. That breast cancer risk is increased with increasing adult height strongly points to early-life nutritional factors in breast cancer.

There is consistent evidence that increased body weight and weight gain during adulthood are associated with increased risk for breast cancer among postmenopausal (but not premenopausal) women.[34,37,112–117] This increased risk is likely due to the higher levels of estrogens produced by extra adipose tissue after menopause; the adverse effect of weight gain is not seen as readily among women taking postmenopausal hormone therapy (hormone replacement therapy), since it may be masked by higher levels of exogenous estrogens. Alcohol intake is also associated with an increase in risk,[103,104,118] particularly for women whose intake of folate is low.[106–109] Moderate to vigorous physical activity has been shown to be associated with decreased breast cancer risk among both premenopausal and postmenopausal women.[3] Although reduction of fat intake to very low levels may reduce breast cancer risk, results from the recent intervention trial found that lowering fat intake to 29% of calories had only a very small effect on risk among postmenopausal

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women.[119] At the present time, the best nutritional advice to reduce the risk of breast cancer is to engage in moderate to vigorous physical activity 45 to 60 minutes on 5 or more days per week, minimize lifetime weight gain through the combination of caloric restriction and regular physical activity, and avoid or limit intake of alcoholic beverages.[6,104,115,120,121]

Colorectal Cancer

Colorectal cancer is the second leading cause of cancer death among American men and women combined.[134] The risk of colorectal cancer is increased in those with a family history of colorectal cancer. Long-term tobacco use and possibly excessive alcohol consumption increase risk, whereas use of aspirin or other nonsteroidal anti-inflammatory drugs, postmenopausal hormone therapy, and possibly increased calcium intake may decrease risk. Currently, however, neither aspirin-like drugs nor postmenopausal hormones are recommended to prevent colorectal cancer because of their potential adverse effects. Studies demonstrate a lower risk of colon cancer among those who are moderately active on a regular basis, and increasing evidence suggests that more vigorous activity may have an even greater benefit in reducing the risk of colon cancer.[53,132] Obesity increases the risk of colon cancer among both men and women, but the association seems to be stronger in men.[3,27] Diets high in vegetables and fruits have been associated with decreased risk,[11] and diets high in processed and/or red meat have been associated with increased risk of colon cancer.[123–125] A growing number of studies support a protective role of calcium[126,127] for colorectal cancer or its precursor, colorectal adenomas. Several studies also suggest that vitamin D[128,129] or a combination of vitamin D and calcium[130] may prevent this cancer. However, because of a potential increase in risk of prostate cancer associated with calcium intake,[131] it would be prudent to limit calcium intake in men to less than 1,500 mg/day until further studies are conducted. The best nutritional advice to reduce the risk of colon cancer is to increase the intensity and duration of physical activity; limit intake of red and processed meat; consume recommended levels of calcium; eat more vegetables and fruits; avoid obesity; and avoid excess alcohol consumption (eg, no more than one drink/day in women, two drinks/day in men).[53,54,122,132] In addition, it is very important to follow the ACS guidelines for regular colorectal screening, as identifying and removing precursor polyps in the colon can prevent colorectal cancer.[133]

Endometrial Cancer

Endometrial cancer is the most common female reproductive cancer in the United States, ranking fourth among all cancers in women in age-adjusted incidence.[134] Although endometrial cancer has been traditionally considered as a single entity, epidemiologic and clinicopathologic evidence points to two separate types. Type I endometrial cancer (low grade, the most common type) is hormonally related, associated with hyperplasia, and tends to have a better prognosis. Type II endometrial cancer (high grade, approximately 10% of endometrial cancers) is not hormonally related, is associated with endometrial atrophy, and tends to have a worse prognosis.[135] Most of the established risk factors for endometrial cancer, summarized here, refer to type I; the causes of type II endometrial are largely unknown.

Most of the major known risk factors for type I endometrial cancer have in common a prolonged and excessive exposure of the endometrium to estrogens unopposed by progesterone, such as postmenopausal estrogen therapy, sequential oral contraceptive formulations, a history of polycystic ovarian syndrome, and obesity.

There is strong evidence of a relationship between obesity and endometrial cancer.[3] In premenopausal women, the increased risk has been attributed to insulin resistance, elevation in ovarian androgens, anovulation, and chronic progesterone deficiency associated with overweight.[135] In postmenopausal women, the increased risk has been attributed to the higher circulating concentration of bioavailable estrogens created from the conversion of androstenedione to estrone in adipose tissue.[3] Studies examining physical activity, which has also been shown to affect endogenous hormone levels, have suggested a decrease in endometrial cancer risk for the highest level of physical activity.[3]

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Vegetable and fiber intakes may decrease risk, whereas red meat, saturated fat, and animal fat may increase risk.[136] At the present time, the best advice to reduce the risk of endometrial cancer is to maintain a healthy weight through diet and regular physical activity, and eat a predominantly plant-based diet rich in vegetables, whole grains, and beans.

Kidney Cancer

In the United States, kidney cancer accounts for 3% of both incident and fatal cancers in men and 2% of cancer cases and deaths in women.[134] The incidence of kidney cancer has been steadily rising by nearly 2% annually since 1975.[137] Approximately 80% to 85% of kidney cancers are renal cell cancers. The etiology of renal cell cancer is largely unknown; however, the most established modifiable risk factors include obesity and tobacco smoking. In 2002, the International Agency for Research on Cancer concluded that there is sufficient evidence for excessive weight as a cause of renal cell cancer.[3] Results for associations between dietary factors and renal cell cancer risk have been limited or inconsistent. At the present time, the best advice to reduce the risk of kidney cancer is to maintain a healthy weight and avoid tobacco use.

Leukemias and Lymphomas

There are no known nutritional risk factors for leukemias or lymphomas at this time.

Lung Cancer

Lung cancer is the leading cause of cancer death among Americans.[11,134] More than 85% of lung cancers occur because of tobacco smoking, and 10% to 14% are attributed to radon exposure. Many studies have found that the risk of lung cancer is lower among smokers and nonsmokers who consume at least five servings of vegetables and fruits a day. A recent review found significantly lower risk of lung cancer with higher consumption of fruit.[11] Although healthful eating may reduce the risk of lung cancer, the risks posed by tobacco remain substantial. Nutritional supplementation with high doses of beta carotene and/or vitamin A has increased (not decreased) lung cancer risk among smokers (see *Beta Carotene*).[76,77] At the present time, the best advice to reduce the risk of lung cancer is to avoid tobacco use and environmental tobacco smoke and to avoid radon exposure. Eating at least five servings of vegetables and fruits every day is also advised.[7,138]

Ovarian Cancer

Cancer of the ovary is the second most common gynecologic cancer and the leading cause of death from gynecologic malignancies.[134] Although the etiology of ovarian cancer is not well understood, hormonal, environmental, and genetic factors have been implicated. Family history of ovarian cancer is a risk factor, but fewer than 10% of ovarian cancers are hereditary.

At the present time there are no established nutritional risk factors for ovarian cancer. In the Pooling Project of Diet and Cancer Cohorts, a study combining the data from 12 cohort studies,[139] there was no indication of an association of risk with total fruit, total vegetable, total fruit and vegetable, or any botanically defined subgroup, and in the European Investigation into Cancer and Nutrition (EPIC) study,[140] a very large cohort study of women in Europe, total fruit, total vegetables, or total fruit and vegetables were unrelated to ovarian cancer risk. The association with milk/dairy products and galactose metabolism has been widely explored with inconsistent results.[141,142] There was no indication of an association with milk/dairy product or calcium consumption in a recent study pooling data from 12 cohort studies,[143] whereas there was some indication of a weak association with lactose intake at a level equivalent to three or more glasses of milk per day. The overall evidence seems to indicate that alcohol consumption at moderate levels may reduce the risk of ovarian cancer.[140,144,145] The role of obesity and physical activity in ovarian cancer risk is unclear.[3,5,146]

Pancreatic Cancer

Pancreatic cancer is the fourth leading cause of cancer death in the United States.[134] Substantial evidence indicates that tobacco smoking, adult-onset diabetes, and impaired glucose tolerance

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increase the risk for pancreatic cancer.[147] Some studies have also shown that obesity and physical inactivity (both factors strongly linked to abnormal glucose metabolism) and higher consumption of red and processed meat are associated with elevated pancreatic cancer risk, and that fruit and vegetable intake is associated with reduced risk,[148] but none of these relationships is yet firmly established. At the present time, the best advice to reduce the risk of pancreatic cancer is to avoid tobacco use, maintain a healthful weight, remain physically active, and eat five or more servings of vegetables and fruits each day.

Prostate Cancer

Prostate cancer is the most common cancer among American men.[134] Although prostate cancer is related to male sex hormones, just how nutritional factors might influence risk remains uncertain.[149] Several studies suggest that diets high in certain vegetables (including tomatoes/tomato products, cruciferous vegetables, soy, beans, or other legumes) or fish are associated with decreased risk. There is some evidence that food or supplements containing specific antioxidant nutrients, such as vitamin E, selenium, beta carotene, and lycopene, may reduce prostate cancer risk. Whether vitamin E and/or selenium reduce prostate cancer incidence is currently being tested in a large clinical trial. Most epidemiologic studies have not consistently distinguished between specific nutrients and the foods in which they occur. The biological plausibility that certain nutrients may affect prostate cancer risk has been strengthened by recent reports of gene–diet interactions for these nutrients and specific genes involved in antioxidant function and DNA repair.[149] Some of the genotypes were fairly common in the predominantly Caucasian populations studied (eg, 25%), and men with the specific genotype who had higher versus lower levels of these circulating nutrients were greatly protected against prostate cancer.[150] Several studies have observed that greater consumption of red meat or dairy products may be associated with increased risk of prostate cancer.[97,98,151] There is also evidence that a high calcium intake, primarily through supplements, is associated with increased risk for more aggressive types of prostate cancer.[131,152] Although obesity has been inconsistently related to prostate cancer development, recent data suggest that being overweight is associated with worse prognosis after diagnosis and treatment among men with prostate cancer.[31,153] Evidence suggests that exercise, in particular vigorous exercise, may impart some benefit for prostate cancer.[3] At the present time, the best advice to reduce the risk of prostate cancer is to eat five or more servings of a wide variety of vegetables and fruits each day, limit intake of red meats and dairy products, and maintain an active lifestyle and healthy weight.

Stomach Cancer

Stomach cancer is the fourth most common cancer worldwide and the number two cause of death from cancer.[134] This cancer, however, is relatively uncommon in the United States. Many studies have found that high intake of fresh fruits and vegetables is associated with reduced risk of stomach cancer, whereas high intake of salt-preserved foods is associated with increased risk.[154,155] There is also convincing evidence that chronic stomach infection by the bacterium *Helicobacter pylori* increases the risk of stomach cancer.[154,155] Although the overall incidence of stomach cancer continues to decrease in most parts of the world, the incidence of this cancer in the gastric cardia has increased recently in the United States and several European countries.[156] The reasons for the increase are under active investigation but may be tied to increases in lower esophageal cancers caused by gastric reflux from abdominal obesity.[156] At the present time, the best advice for reducing the risk of stomach cancer is to eat at least five servings of vegetables and fruits daily, reduce salt-preserved food consumption, and maintain a healthy weight.

Upper Aerodigestive Tract Cancers

In the United States, upper digestive tract cancers are significantly more common among men than women. Tobacco (including cigarettes, chewing tobacco, and snuff) and alcohol, alone, but especially when used together, increase the risk for cancers of the mouth, larynx, pharynx, and esophagus; these exposures contribute

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substantially to the gender disparities for these cancers. Obesity increases the incidence of adenocarcinoma in the lower esophagus and at the junction of the esophagus and stomach, likely as a result of epithelial damage, metaplasia, and dysplasia associated with acid reflux. There is some evidence to suggest that consuming beverages and foods that are very hot in temperature may increase risk for oral and esophageal cancers, likely as a result of thermal damage to exposed tissue. Eating recommended amounts of vegetables and fruits probably reduces the risk of oral and esophageal cancers. At the present time, the best advice to reduce the risk of cancers of the upper digestive and respiratory tracts is to avoid all forms of tobacco, restrict alcohol consumption, avoid obesity, and eat at least five servings of a variety of vegetables and fruits each day.[157–159]

COMMON QUESTIONS ABOUT DIET, PHYSICAL ACTIVITY, AND CANCER

Because people are interested in the relationship that specific foods, nutrients, or lifestyle factors have to specific cancers, research on health behaviors and cancer risk is often widely publicized. Health professionals who counsel patients should emphasize that no one study provides the last word on any subject, and that individual news reports may overemphasize what appear to be contradictory or conflicting results. In brief news stories, reporters cannot always put new research findings in their proper context. The best advice about diet and physical activity is that it is rarely, if ever, advisable to change diet or activity levels based on a single study or news report. The following questions and answers address common concerns about diet and physical activity in relation to cancer.

Alcohol

Does alcohol increase cancer risk? Yes. Alcohol increases the risk of cancers of the mouth, pharynx, larynx, esophagus, liver, colorectum, and breast.[5,101] People who drink alcohol should limit their intake to no more than two drinks per day for men and one drink per day for women.[15] A drink is defined as 12 ounces of beer, 5 ounces of wine, or 1.5 ounces of 80-proof distilled spirits. The combination of alcohol and tobacco increases the risk of some cancers far more than the independent effects of either drinking or smoking.[5] Regular consumption of even a few drinks per week is associated with an increased risk of breast cancer in women—a risk that is particularly high in women who do not get enough folate.[103,104,109] Women at high risk of breast cancer may consider abstaining from alcohol.

Antioxidants

What are antioxidants, and what do they have to do with cancer? Along with a number of other defense systems, the body appears to use certain nutrients in vegetables and fruits to protect the body against damage to tissues that occurs constantly as a result of normal metabolism (oxidation). Because such damage is associated with increased cancer risk, the so-called antioxidant nutrients are thought to protect against cancer.[160] Antioxidants include vitamin C, vitamin E, carotenoids, and many other phytochemicals. Studies suggest that people who eat more vegetables and fruits, which are rich sources of antioxidants, may have a lower risk for some types of cancer.[11] Clinical studies of antioxidant supplements are currently under way, but studies have not yet demonstrated a reduction in cancer risk from vitamin or mineral supplements[73] (see also *Beta Carotene*, *Lycopene*, *Vitamin E*, *Supplements*). To reduce cancer risk, the best advice presently is to consume antioxidants through food sources rather than supplements.

Aspartame

Does aspartame cause cancer? No. Aspartame is a low-calorie artificial sweetener that is about 200 times sweeter than sugar. Current evidence does not demonstrate any link between aspartame ingestion and increased cancer risk.[161,162] People with the genetic disorder phenylketonuria should avoid aspartame in their diets.

Beta Carotene

Does beta carotene reduce cancer risk? Because beta carotene, an antioxidant chemically related to vitamin A, is found in vegetables and fruits,

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and because eating vegetables and fruits is associated with a reduced risk of cancer, it seemed plausible that taking high doses of beta carotene supplements might reduce cancer risk. However, the results of three major clinical trials show this is not the case. In two studies in which people were given high doses of beta carotene supplements in an attempt to prevent lung cancer and other cancers, the supplements were found to increase the risk of lung cancer in cigarette smokers, and a third study found neither benefit nor harm from them.[76–78] Therefore, consuming vegetables and fruits that contain beta carotene may be helpful, but high-dose beta carotene supplements should be avoided.

Bioengineered Foods

What are bioengineered foods, and are they safe? Bioengineered foods are made by adding genes from other plants or organisms to increase a plant's resistance to insect pests, retard spoilage, or improve transportability, flavor, nutrient composition, or other desired qualities. In theory, these added genes might create substances that could cause adverse reactions among sensitized or allergic individuals. However, there is currently no evidence that the substances found in bioengineered foods now on the market are harmful or that they would either increase or decrease cancer risk because of the added genes.

Calcium

Is calcium related to cancer? Several studies have suggested that foods high in calcium might help reduce the risk for colorectal cancer,[163] and calcium supplementation modestly reduces the formation of colorectal adenomas.[126,127] There is also evidence, however, that a high calcium intake, primarily through supplements, is associated with increased risk for prostate cancer, especially for prostate cancers that are more aggressive.[131] In light of this, both men and women should strive to consume recommended levels of calcium, primarily through food sources. Recommended intake levels of calcium are 1,000 mg/day for people aged 19 to 50 and 1,200 mg/day for people older than 50 years.[164] Dairy products are excellent sources of calcium, as are some leafy vegetables and greens. People who obtain much of their calcium from dairy products should select low-fat or nonfat choices to reduce intake of saturated fat.

Cholesterol

Does cholesterol in the diet increase cancer risk? Cholesterol in the diet comes only from foods derived from animal sources—meat, dairy products, eggs, and animal fats such as butter or lard. Although some of these foods (eg, processed and red meats) are associated with higher risk of certain types of cancer, at present, there is little evidence that this increased risk is specifically related to cholesterol. Lowering blood cholesterol lowers cardiovascular disease risk, but there is no evidence that lowering blood cholesterol has an effect on cancer risk.

Coffee

Does drinking coffee cause cancer? No. Caffeine may heighten symptoms of fibrocystic breast lumps (a type of benign breast disease) in some women, but there is no evidence that it increases the risk of breast cancer or other types of cancer. The association between coffee and pancreatic cancer, widely publicized in the past, has not been confirmed by recent studies; there does not appear to be any connection between coffee drinking and cancer risk.[165]

Fat

Will eating less fat lower cancer risk? There is little evidence that the total amount of fat consumed increases cancer risk. However, diets high in fat tend to be high in calories and may contribute to obesity, which in turn is associated with increased risk of cancers at several sites. There is evidence that certain types of fat, such as saturated fats, may have an effect on increasing cancer risk.[97] There is little evidence that other types of fat (omega-3 fatty acids, found primarily in fish), monounsaturated fatty acids (found in olive and canola oils), or other polyunsaturated fats reduce cancer risk.

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Fiber

What is dietary fiber, and can it prevent cancer? Dietary fiber includes a wide variety of plant carbohydrates that are not digestible by humans. Specific categories of fiber are "soluble" (like oat bran) or "insoluble" (like wheat bran and cellulose). Soluble fiber helps to reduce blood cholesterol and, therefore, helps lower the risk of coronary heart disease. Good sources of fiber are beans, vegetables, whole grains, and fruits. Associations between fiber and cancer risk are weak, but consumption of these foods is still recommended because they contain other nutrients that may help reduce cancer risk and because of their other health benefits.[15]

Fish

Does eating fish protect against cancer? Fish is a rich source of omega–3 fatty acids. Studies in animals have found that these fatty acids suppress cancer formation or hinder cancer progression, but there is limited suggestive evidence of a possible benefit in humans.[166] While consuming fish rich in omega-3 fatty acids is associated with reduced risk of cardiovascular disease, some types of fish may contain high levels of mercury, polychlorinated biphenyls (PCBs), dioxins, and other environmental pollutants. Levels of these substances are generally highest in older, larger, predatory fish such as swordfish, tilefish, shark, and king mackerel. (In addition, some studies have shown that farm-raised fish may carry more of these toxins than fish caught in the wild.) Women who are pregnant, planning to become pregnant, or who are nursing, and young children should not eat these fish.[167] Consumers should be advised to vary the types of fish consumed to reduce the likelihood of exposure to excessive levels of toxins.

Research has not yet demonstrated whether the possible benefits of fish consumption may be reproducible by taking omega-3 or fish oil supplements.

Fluorides

Do fluorides cause cancer? No. Extensive research has examined the effects of fluorides given as dental treatments, or added to toothpaste, public water supplies, or foods on cancer risk. Fluorides have not been found to increase cancer risk.[168]

Folate

What is folate, and can it prevent cancer? Folate is a B vitamin found in many vegetables, beans, fruits, whole grains, and fortified breakfast cereals. Since 1998, all grain products have been fortified with folate. Folate deficiency may increase the risk of cancers of the colorectum and breast, especially in people who consume alcoholic beverages.[106–108,169] Current evidence suggests that to reduce cancer risk, folate is best obtained through consumption of vegetables, fruits, and enriched grain products.

Food Additives

Do food additives cause cancer? Many substances are added to foods to preserve them and to enhance color, flavor, and texture. New additives must be cleared by the Federal Drug Administration before being incorporated into the food supply, and rigorous testing in animal models to determine any effects on cancer is undertaken as part of this process.[170] Additives are usually present in very small quantities in food, and no convincing evidence exists that any additive consumed at these levels causes human cancers.

Garlic

Can garlic prevent cancer? The health benefits of the *Allium* compounds contained in garlic and other vegetables in the onion family have been publicized widely. Garlic is currently under study for its ability to reduce cancer risk. Insufficient evidence exists at this point to support a specific role for this vegetable in cancer prevention.[171,172]

Genetics

If our genes determine cancer risk, how can diet help prevent cancer? Damage to the genes that control cell growth and maturation can either be inherited or acquired during one's lifetime. Certain types of mutations or genetic damage can increase the risk of cancer. Nutrients in the

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diet can protect DNA from being damaged. Physical activity, weight control, and diet might delay or prevent the development of cancer in people with an increased genetic risk for cancer. The many interactions between diet and genetic factors are an important and complex topic of widespread current research interest.

Irradiated Foods

Do irradiated foods cause cancer? No. Radiation is increasingly used to kill harmful organisms on foods to extend their "shelf life." Radiation does not remain in the foods after treatment, however, and at the present time, there is no evidence that consuming irradiated foods increases cancer risk.[173,174]

Lycopene

Will lycopene reduce cancer risk? Lycopene is the red-orange carotene pigment found primarily in tomatoes and tomato-based foods, and to a lesser extent, in pink grapefruit and watermelon. Several studies have reported that consumption of tomato products reduces the risk of some cancers.[149,175] It is uncertain, however, whether lycopene is the micronutrient responsible for this association. It is important to note that even if lycopene in foods is associated with lower risk for cancer, the conclusion cannot be made that high doses taken as supplements would be either more effective or safe.

Meat: Cooking and Preserving

Should I avoid processed meats? Some epidemiologic studies have linked high consumption of processed meats with increased risk of colorectal and stomach cancers.[93–95,154] This association may or may not be due to nitrites, which are added to many luncheon meats, hams, and hot dogs to maintain color and to prevent contamination with bacteria. Consumption of processed meats and meats preserved by methods involving smoke or salt increases exposure to potentially carcinogenic chemicals, and so should be minimized.

How does cooking meat affect cancer risk? Adequate cooking is necessary to kill harmful microorganisms within meat. However, some research suggests that frying, broiling, or grilling meats at very high temperatures creates chemicals that might increase cancer risk. Although studies show that these chemicals can damage DNA and cause cancer in animals, it is not clear how much they, rather than other components of meat, contribute to the increase in colorectal cancer risk associated with heavier meat consumption in epidemiologic studies. Techniques such as braising, steaming, poaching, stewing, and microwaving meats minimize the production of these chemicals.

Obesity

Does being overweight increase cancer risk? Yes. Overweight and obesity are associated with increased risk for cancers of the breast among postmenopausal women, colon, endometrium, gallbladder, adenocarcinoma of the esophagus, pancreas, renal cell (kidney) carcinoma, and possibly other sites as well.[3,27–30,33,176] Although there is limited research on whether losing weight reduces cancer risk, some research suggests that weight loss does reduce the risk of breast cancer.[36,38] Because of other proven health benefits to losing weight, people who are overweight are encouraged to stop gaining weight, then to lose weight and prevent regaining it. The avoidance of excessive weight gain during adulthood is important not only to reduce cancer risk, but the risk of other chronic diseases as well.[13,14]

Olive Oil

Does olive oil affect cancer risk? Consumption of olive oil is associated with a reduced risk of cardiovascular disease, but it is not associated with any increased risk of cancer and is most likely neutral with respect to cancer risk. Although olive oil is a healthy alternative to butter and margarine, it is a significant source of calories and should be used in moderation.

Organic Foods

Are foods labeled organic *more effective in lowering cancer risk?* The term *organic* is popularly used to designate plant foods grown without pesticides and genetic modifications. At present, no research exists to demonstrate whether such foods are more effective in reducing cancer risk